

REMARKS

Applicants' Amendments

Applicants have amended their claims as follows. Claim 18 has been amended to clarify that the flexible compositions of the invention are blends having a flexural modulus of 500 MPa or less. Claim 26 has been amended to clarify that the flexible compositions of the claim comprise one or more random copolymers of propylene A and one or more plastomers B. Claim 24 has been amended to correct a typographical error. Claims 31 and 32 to flexible compositions further having an oligomer (C₁₂-C₆₄) content less than about 1250 and 1000 ppm, respectively, are added to the application. Claims 33 – 34 to flexible sheeting or film and cable insulation or cable sheathing comprising the composition of claim 31 are also added to the application.

Support for the amendment to Claim 18 can be found at page 8 (lines 21 – 22 and line 37, et seq) of the specification. Support for the amendment to Claim 26 can be found at page 7 (line 16, et seq) of the specification. Support for new claims 31 – 34 can be found at page 8 (lines 33 – 35) and page 10 (lines 22 –35). Accordingly, Applicants' amendments introduce no new matter into the application.

Status of the Application

Claims 18 – 30 are pending in the application. All claims stand rejected. Claim 11 (sic 18) has been interpreted to specify that "while there must be one polypropylene resin and a polyethylene resin, there may be several propylene resins with a polyethylene resin."

Claim 26 has been rejected under 35 USC 112, second paragraph, as indefinite. Claim 26, which depends from claim 18, is said to be unclear as to whether the claim embraces "one or more propylene polymers with an ethylene polymer" as pointed out in the interpretation for claim 18 above.

Claims 18 – 20 and 23 – 29 are rejected under 35 USC 102(b) as anticipated by Tanaka. Tanaka is said to teach the manufacture of a polymer blend essentially identical to that recited and claimed herein in that a random copolymer of propylene, having the characteristics of melting point and melt flow index as recited may be admixed with a random copolymer of ethylene and at least one C₅-C₁₀ alpha-olefin, having the characteristics of density, melt flow index and molecular mass distribution as recited, in amounts as specified in the instant claims. Tanaka is said to further teach the employment of a propylene/ethylene/1-butene random copolymer. Attention is drawn to the Abstract, col. 2 (lines 41 – 64), col. 3 (lines 10 – 67) and

the Production Examples (cols. 21 – 22). The physical characteristics for the polymers mixed are said to be overlapping directly with those recited and claimed by Applicants. The flexural modulus values expressed in claims 20 and 25 are said to be inherent in the compositions produced in accordance with the teachings of Tanaka because all other parameters of compositional limitation and physical characteristics are embraced by the patent compositions.

Claims 18, 19, 21, 24, 25, 29 and 30 are rejected under 35 USC 102(b) as anticipated by Ueda. Ueda is said to teach the production of the contemplated polymer blend in the Abstract and at page 2 (line 37) to page 3 (line 3). Attention is drawn to page 13 (line 58) to page 15 (line 47) for the polymers employed and their physical characteristics that overlap directly with those recited and claimed by Applicants.

Claims 18 – 30 are rejected under 35 USC 103(a) as unpatentable over Tanaka for the reasons set out above and further because Tanaka is said to teach the selection of C₃-C₈ alpha-olefin at col. 3 (lines 45 – 54), which range is embraced in toto by the recitation of C₃-C₁₀ by Applicants' claim 18. The Examiner asserts that any of those monomers, as recited in Applicants' claims 21, 22 or 30 (sic) would have been an obvious modification to the composition, as directed by the teachings of the patent. The Examiner asserts the Applicants' claims would be clearly within the ordinary skill of the art from the teachings of the patent.

Brief Description of the Invention

Before addressing the outstanding rejections, Applicants believe it would be useful to briefly describe the substance of the invention. Applicants have developed novel flexible polymeric compositions that are particularly well suited for applications not previously satisfied in the art. Applicants' flexible compositions are particularly well suited for the manufacture of flexible films, flexible sheeting and of cable sheathing or insulation. The compositions are the product of blends of carefully selected polymer materials. In particular, the compositions comprise one or more propylene polymers A having no elastomeric fraction, wherein the random copolymer A is selected from the group consisting of A1) copolymers of propylene and ethylene comprising from 3 to 6% by weight of monomeric units derived from ethylene; A2) copolymers of propylene and butene comprising from 15 to 20% by weight of monomeric units derived from butene; and A3) terpolymers of propylene, ethylene and butene comprising from 0.5 to 2.5% by weight of monomeric units derived from ethylene and from 5 to 15% by weight of monomeric units derived from butene and a plastomer B. The random propylene copolymers used to make the compositions are further characterized by a melting point of at least 100 °C and not exceeding 140 °C and a melt flow index of from 0.5 to 15 g/10 min (ASTM D1238, 1986). The plastomers are further characterized by comprising a random copolymer of ethylene

and at least one C₃-C₁₀ alpha-olefin, a density of from 0.860 – 0.920 g/ cm³, a melt flow index of from 0.5 to 30 g/ 10 min, and a molecular mass distribution M_w/M_n of at most 4. The flexible compositions of the invention have a flexural modulus of 500 MPa or less.

The compositions are also characterized by low oligomer (C₁₂-C₆₄) content. The oligomer content of the compositions can be less than 1250 ppm or 1000 ppm. The low oligomer content of the compositions of the invention result in compositions and end use products with higher clarity and lower stickiness than compositions known to the art, properties that are important in end use products made with more conventional compositions. For example, undesirable fogging and stickiness are reduced in sheets and cables made from the compositions of the invention.

Response to the Rejections

Applicants traverse the rejections in light of the amendments submitted hereto and the reasons discussed herein. Applicants have amended claim 26 to more clearly reflect that flexible compositions of the claim comprise one or more random copolymers of propylene A and one or more plastomers B. Applicants submit that, as amended, Claim 26 is sufficiently definite to satisfy the second paragraph of 35 USC 112.

Applicants submit the rejection of claims 18 – 20 and 23 – 29 as anticipated by Tanaka and the rejection of claims 18 – 30 as obvious in view of Tanaka are unfounded for several reasons. In contrast to Applicants' invention, which is directed to flexible compositions and their use in flexible sheeting, film and cable insulation or sheathing, Tanaka discloses compositions for use in non-stretched film. Applicants submit non-stretched film is not considered to be flexible film by the art. This distinction is highlighted by the differing properties important for the uses cited for the compositions. Applicants' compositions and applications depend on high flexibility as evidenced by the low flexural modulus characteristic of the compositions for their utility. As amended, all of Applicants' claims now specify that the compositions of the invention have a flexural modulus of 500 MPa or less. In contrast, irrespective of whatever Tanaka may teach regarding individual polymers, Tanaka teaches nothing about flexural modulus and instead features very different properties such as film transparency, impact resistance and low temperature heat-sealability useful for the packaging applications typical for non-stretched film (See, e.g., the Abstract, col. 20 (lines 27 – 48), and Table 1 at cols. 23 – 24). Thus, Tanaka does not anticipate Applicants claimed compositions or render them obvious. Neither does Tanaka disclose or suggest that the compositions disclosed therein can or should be used in the applications identified by Applicants for Applicants' compositions. For this reason, Applicants' claims 29 and 30 are separately patentable over Tanaka.

Applicants also submit their claimed compositions are not anticipated or rendered obvious by Tanaka because Tanaka does not disclose compositions characterized by the same sets of parameters as Applicants claim. Although in their broadest reach, there may have appeared to be some minor overlap between the Applicants' claimed compositions and Tanaka's disclosure, when considered with the applications to which Applicants' compositions are directed, the actual compositions claimed by Applicants are novel and unobvious. Relative to any possible overlap, Applicants' claimed compositions can be considered akin to an improvement over the compositions disclosed by Tanaka. Such improvements are patentable. Patentability is further evidenced by the suitability of Applicants' claimed compositions to applications neither disclosed nor suggested by Tanaka.

Tanaka discloses only a polypropylene resin comprising three separate polymers: (A) a polypropylene resin (e.g., a propylene homopolymer, a propylene/ alpha-olefin copolymer or propylene/ alpha-olefin block copolymer); (B) an ethylene/ alpha-olefin random copolymer; and (C) a propylene/ ethylene/ 1-butene random copolymer that meets several conditions. In contrast, Applicants' compositions typically comprise two polymers. Moreover, the characteristics of the polymers that can be used in Applicants' compositions are not coincident with the properties of the polymers that are used in Tanaka's compositions. For example, the propylene/ ethylene/ 1-butene random copolymer (C), which must be included in the compositions of Tanaka, generally comprises 50 – 88 mole % propylene, 2 – 30 mole % ethylene and 10 – 40 mole % 1-butene. (Preferred embodiments comprise narrower bands of these monomers. See, e.g., col. 6 (lines 33 – 43).) In contrast, the propylene, ethylene and butene terpolymer that may be used in Applicants' compositions comprise 0.5 – 2.5% by weight of units of ethylene and 5 – 15% by weight of units of butene, i.e., lower and narrower bands of these monomers than disclosed by Tanaka. This difference is evidenced by Tanaka's Production Example 3, the only example of Tanaka's (C) polymer in the disclosure, where the content of the ethylene and 1-butene units are 10.2 mole % and 21.3 mole %, respectively. Both are outside the ranges specified by Applicants for their component polymer A3. Nowhere does Tanaka disclose or suggest that polymer compositions corresponding to Applicants' A3 would be useful for the high flexibility compositions claimed by Applicants. Similarly, Applicants' A3 polymer is further characterized by a melt flow rate in the range of 0.5 – 15 g/ 10 min, while the melt flow rate of Tanaka's copolymer (C) is generally in the range of 0.1 – 50 g/ 10 min and especially preferably in the range 0.1 – 10 g/ 10 min. Again, these ranges are not coincident to the corresponding ranges for Applicants' compositions and do not disclose or suggest any suitability of the compositions for applications identified by Applicants' for their compositions.

Applicants submit the rejection of claims 18 – 30 as anticipated by Ueda is unfounded for several reasons. In contrast to Applicants' compositions, which are polymer blends, Ueda's disclosure is directed to a process for making impact copolymers and the resulting impact copolymer compositions. Moreover, irrespective of whatever properties Ueda may teach regarding component polymers, Ueda teaches nothing regarding Applicants' highly flexible compositions, which are used in flexible sheeting, film and cable insulation or sheathing. Ueda discloses compositions with excellent rigidity (rather than flexibility), heat resistance and impact resistance for general usage (See Abstract; see also Effect Of The Invention at page 16 (lines 23 –2 26)). Ueda discloses no highly flexible compositions and no particular application for highly flexible polymer compositions. As amended, all of Applicants' claims specify a flexural modulus of 500 MPa or less. In contrast, Ueda teaches no such flexible compositions and all polymer compositions disclosed by Ueda have a flexural modulus greater than 5,300 kg/cm² or about 520 MPa (see the examples of Ueda).

Finally, Applicants submit that new claims 31 – 34 are patentable over the cited references for the reasons cited above. Applicants also submit the cited references do not disclose or suggest alone or in combination compositions with the claimed high flexibility and low oligomer content as claimed by Applicants or that these compositions enable superior products. Accordingly, Applicants submit that new claims 31 – 34 are separately patentable over the cited art.

In view of the amendments submitted herewith and the foregoing discussion, Applicants submit that all of claims 18 – 34 now pending in the application are patentable over the cited art. Applicants further submit all claims are in condition for allowance, which action is earnestly solicited.

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Respectfully submitted,

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